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**Economic Publications of the U. S. Department of Agriculture.**—

Several important papers have been published recently by the staff of the Biological Survey, U. S. Department of Agriculture, relating to economic ornithology. One by Ned Dearborn deals with the English Sparrow.<sup>1</sup> Continued investigation has only emphasized the fact that these birds are everywhere a nuisance,—noisy, filthy and destructive, and the little good they do in destroying some noxious insects is far overbalanced by the damage they inflict. This bulletin deals mainly with the best methods for their destruction and recommends the continual breaking up of their nests and the trapping of the old birds, as the most efficacious means for lessening their numbers. Several styles of traps are figured and described in detail.

A bulletin on the economic status of nineteen common Game, Aquatic and Rapacious birds is the joint work of W. L. McAtee and F. E. L. Beal,<sup>2</sup> though the former author is responsible for the bulk of the sketches. As in other similar publications the distribution and general habits of the several species are briefly considered, while the results of the study of stomach contents are given in considerable detail. Several birds are here treated which have not been included in previous publications of the Department.

Mr. W. L. McAtee has another paper in the Yearbook of the Department of Agriculture dealing with the 'Bird Enemies of the Codling Moth.'<sup>3</sup> He finds that birds are the most effectual natural enemies of this pest and 'in some localities they destroy from 66 to 85 per cent of the hibernating larvæ.' The most useful species are the Downy Woodpecker, Black-headed Grosbeak, Bullock's Oriole and Bush-Tit.—W. S.

**The Food of Birds in India.**<sup>4</sup>—Under this title Mr. C. W. Mason brings together most of the recorded knowledge upon the food of Indian birds, and presents also field observations of his own, as well as the results of the examinations of 1325 stomachs. The work is edited by the Imperial Entomologist, H. Maxwell-Lefroy, who adds a section summarizing the value of birds to agriculture. Mr. Mason has done a very useful thing in collecting the notes on bird food from the 3 most important Indian scientific journals, and from 10 standard reference works on the avifauna of India. It greatly lightens the task of future students of economic ornithology in India. Moreover the generous leaven of new material gives point and vitality to the whole paper.

"From the economic point of view," says Mason, "the scientific identi-

<sup>1</sup> The English Sparrow as a Pest. By Ned Dearborn. U. S. Department of Agriculture, Farmers' Bulletin, 493, 1912, pp. 1-24, figs. 1-17.

<sup>2</sup> Some Common Game, Aquatic, and Rapacious Birds in Relation to Man. By W. L. McAtee and F. E. L. Beal. U. S. Department of Agriculture, Farmer's Bulletin, 497, 1912, pp. 1-30, figs. 1-14.

<sup>3</sup> Bird Enemies of the Codling Moth. By W. L. McAtee. Yearbook U. S. Department of Agriculture for 1911 (1912), pp. 237-246. (Also separate.)

<sup>4</sup> Mem. Dept. Agr. India. Ent. Ser. Vol. III, Jan., 1912, 371 pp.

fication of birds' food is of the utmost importance, and especially with regard to the insect portion. Economic ornithology is, therefore, a sister science to economic entomology, just as much or perhaps even more so than botany. To aid agricultural interests, nature is called in practically and artificially, and every effort should be made to use such helps from every possible source. Wild birds are the source in question here. . . . We can . . . by encouragement of useful species and destruction of harmful ones, check the attacks of insects on crops, and enable the country to increase crop outturns, and in every way benefit agricultural and therefore the country's interest." (p. 5).

It is interesting to note that Mr. Mason has reached the same conclusion about several points as have economic investigators in the United States. For instance, his opinion as to the low value of generalized statements founded on field observations on the food of birds agrees with our experience. He properly esteems field observation, however, as a valuable supplement to stomach examination. Mason doubts the value of observations on caged birds, saying "if the natural food is but vaguely known, we learn practically nothing by this method." (p. 15.) Indian birds, like those of the United States, are very fond of grasshoppers. "They are eaten by practically every species of insectivorous bird, and form one of the main supplies from which birds in India draw their insect food." (p. 325.) Fondness for *Scarabæidæ* and weevils is also characteristic of birds of both countries. Mason says furthermore that "butterflies do not form any appreciable proportion of the food of any . . . species of bird," a conclusion agreeing perfectly with experience in the United States. We have been informed however by supporters of the mimicry theory that in the tropics all is different and that butterflies are freely eaten by birds. Mason's data from the examination of the stomachs of tropical birds is by no means the only evidence that these statements are highly speculative. In commenting on Frank Finn's experiments in feeding butterflies to birds, which Finn at the time thought afforded proof that there is a natural taste for butterflies among birds, Mason justly remarks "they have little importance to economic ornithology since most of the experiments were conducted with caged birds, these therefore being under unnatural conditions." (p. 338.)

Mason makes some very justifiable remarks on the economic value of seed-eating birds, expressing views which may be more or less justly applied in the United States. He says: "In India I consider a bird eating weed seed as of no value whatever. They may keep weeds down to a certain extent, but this is of minor importance in a country where labour is cheap and where farming is not practised on such intensive lines as elsewhere. Even in intensive cultivation we cannot rely on weeds being kept down by birds and the expense of cultivation to eliminate weeds is, I believe, not reduced in the slightest by the action of birds." (p. 9.) In addition to this he says: "We can attach little, if any, importance in India to weed-seed or weed-eating birds; we attach no more importance to them than we do to weed eating insects. As a rule a weed-seed eating bird is spoken of as

beneficial, while we seldom hear it said or see it stated that an insect with identically the same food material is beneficial. It is needless to say that both the birds and the insects have the same economic importance." (p. 309.) This point is very well taken, and brings us face to face with the dilemma of rating many weevils as beneficial when they are certainly potentially injurious and cases of the transfer of their attentions to cultivated plants are not rare. It is a more practicable as well as more correct course to follow Mason in rating them as well as the seed-eating birds as of neutral significance.

We are rather surprised to learn that Mason considers ants as of neutral importance. They are far from so being in the American tropics, where they are practically the "lords of creation." Even in the United States we believe their bad qualities are preponderant. Mason differs decidedly from American investigators regarding the value of the volumetric method of estimating the contents of birds' stomachs, and we shall discuss this important question at length elsewhere.

Part IV of this report, a summary of the value of birds to agriculture is of great interest, as being written by the eminent economic entomologist, H. Maxwell-Lefroy. Some of his conclusions are as follows:

"One has only to read the lists of the food of beneficial species to get an idea of the immense part they play in reducing insect damage. Nearly all insects have special enemies such as parasites which attack each individually, but which produce alternative abundance and scarcity of each insect; that is, with the natural action of the special checks such as parasites, you get alternate 'Waves' of insect pest and parasite; this is where the birds' importance is shown; they are not restricted, they eat many kinds of insects and when a pest has for the time got ahead and is abundant the birds are there to feed on it just because it is abundant and because at one time one is abundant, at another time another is, and the birds eat them all. To put it figuratively they cut off the tops of the waves and tend to keep them all at a uniform level, none being ever destructively abundant. In my opinion from man's point of view this is the special function in nature of birds and if the bird population is small outbreaks of insects are frequent." (p. 364.)

"The impression one gains by reading the detailed records and by correlating it with one's knowledge of the insects is of a ceaseless war waged by birds, not as a war but as the daily search for food, on edible insects which are mainly those destructive ones which have a compensating very high ratio of increase and which are ceaselessly breeding and increasing against the ravages caused in their numbers by their enemies." (p. 368.)

"It is difficult to overestimate the value of birds as a class and their function seems to be, not so much the keeping down of individual destructive species (which is done by special parasites each destructive insect has), as the cutting off of the crest of the wave of increase, the checking of those insects which by favour of climatic or other influence elude their checks and become abundant." (p. 369.)

Coming from so distinguished an entomologist, these conclusions carry much weight, and they are well worth the attention of certain economic entomologists of the United States, who have expressed very different views of the relative importance of birds and parasitic insects.— W. L. M.

**Bryant, on Relation of Birds to an Insect Outbreak in California.**<sup>1</sup>—

This valuable economic paper deals with an outbreak of a butterfly, *Eugonia californica*, which swarmed over portions of California and the larvæ of which defoliated the Snow-brush and Buck-brush, two species of *Ceanothus*. Mr. Bryant's investigations show that five species of birds fed upon the butterflies. Brewer's Blackbird (*Euphagus cyanocephalus*) being the most important and consuming 95 per cent of all the butterflies eaten by birds. Butterflies seem to be rarely eaten by birds under normal conditions and the change of food in this instance is interesting as illustrating how valuable a bird not usually of economic importance may become under extraordinary conditions. The great benefit entailed in the destruction of female butterflies before or during ovipositing as compared with the destruction of larvæ is also pointed out by the author and he estimates that of one Brewer's Blackbird destroyed 100,000 butterflies in a month and his observations seem to support him. If one third of these were females, the destruction of eggs would amount to 336,000! — W. S.

**Economic Ornithology in Recent Entomological Publications.**—

The following reviews relate exclusively to publications of the U. S. Bureau of Entomology, hence the name of that office is not repeated in the reference. The first article,<sup>2</sup> in point of date of issue, which we desire to note deals with the bill-bug (*Sphenophorus callosus*). This species, which does great damage to corn in many states, is commonly known in the Carolinas as the "curlew-bug." This appellation refers to a point in common between the bird and the beetle — a long curved beak. One bird enemy of the curlew-bug, the Nighthawk, is mentioned on the authority of the Biological Survey. The finding of not only this species, but of several other *Sphenophorus*, in stomachs of Nighthawks, has a bearing on a debated point, i. e., whether these beetles fly. There is no doubt that most if not all of those eaten by the Nighthawk are taken on the wing.

The false wireworms of the genus *Eleodes*, family Tenebrionidæ, are said<sup>3</sup> to do more damage to newly planted grain in the northwestern states than any insect pests other than the true wireworms of the family Elateridæ. The Sage Hen, the Burrowing Owl, and Butcherbird are said to feed upon them and Brewer's Blackbirds often follow the plow to pick up the larvæ and pupæ. Western Bluebirds were seen to feed on larvæ which had

<sup>1</sup> The Relation of Birds to an Insect Outbreak in Northern California during the Spring and Summer of 1911. By Harold C. Bryant. The Condor, Vol. XIII, Nov., 1911, pp. 195-208.

<sup>2</sup> Webster, F. M. The so-called "curlew-bug." Bull. 95, Pt. IV. April 10, 1912.

<sup>3</sup> Hyslop, J. A. Bull. 95, Pt. V, April 22, 1912.